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SOCIETY OF ARTS.

FRIDAY, MAY 20th, 1853.

TWENTY-FIRST ORDINARY MEETING,

Wednesday, May 18th, 1853.

THE Twenty-first Ordinary Meeting of the Society was held on Wednesday, the 18th instant, the Rev. James Booth, LL.D., F.R.S., in the chair.

The following were elected Members :

Chadwick, David, Salford.
Gibb, Capt. C. J., R.E., Woolwich.
Graham, William, 74, Old Broad-street.
Gregg, S. G., 43, Rectory-place, Woolwich.
Jones, Arthur O'Brien, Epsom.
Lloyd, George, M.D., Norton-lodge, near Warwick.

A paper was read "On the Proposed Central American Canal, and its Relations to Commerce," by A. G. Findlay, Esq., F.R.G.S.

The existence of the American continent in modern European history is a recent fact, not older than very many of the most familiar ecclesiastical and other edifices around us; yet European art and civilization have almost totally displaced the original systems which existed at the period of the re-discovery by Columbus. The Spanish and Portuguese influences have extended in the central portions chiefly, or those more assimilated to the parent climate, not farther north or south than 30° or 35°, while the more vigorous Anglo-Saxon race have industriously pursued wealth and commerce in the more temperate or changing climates of the north or south.

Yet during the very earliest periods of European possession the Isthmian Canal was a great desideratum, and Cortes obtained a grant of land in Tehuantepec, which he proposed to enhance the value of, by connecting the two oceans across it. This fact, which was subsequently often mooted, is important to be remembered now, in the present immensely increased necessity for it.

The object of this paper will be to show the peculiarity of the geographical position of the American Isthmus, and, consequently, the peculiarity of its climate; of some hitherto unnoticed influences in the current systems which centre here, and which bear most strongly upon any system of navigation;—then to show what new fields for commercial enterprise it will open, and what existing advantages it will increase.

The revolution of the earth and the solar heat causes the phenomena of the trade winds within the tropics. These blow from N.E. and S.E., meeting near, but not *on*, the equator,—a fact due to the unequal distribution of land and water in the two hemispheres. The line of junction is between latitude 4° and 10° N., and Panama lies in this interval, and suffers accordingly from the calms and changing winds due to its position. This belt of calms is a very great obstacle to ships crossing it in the Atlantic and Pacific. It has a great influence on climate also; for the trade winds being evaporating winds, on meeting, deposit the water with which they are then saturated, and Panama during the time of the sun's

N. declination is deluged with rain, in quantities sufficient to fill the high level of any canal which might be formed with locks.

To the direction of winds that of currents is mainly owing, and the waters of each ocean circulate around the parallel of 30° N. or S. In the Atlantic the water is all forced into the Gulf of Mexico, and is presumed to raise its normal level, from the fact that the Gulf-stream rushes out of it in an opposite direction. This crossing the Atlantic from W. to E. ameliorates the climate of the British Islands, which would otherwise be like Labrador, in the same latitude. If the same process went on in the Pacific, and its waters were all propelled to the westward, the Pacific side would be many feet lower than the Atlantic; but a current, hitherto overlooked, runs from W. to E. *under the belt of calms*, entirely across the Pacific into the Bay of Panama, and thus compensates the level, which is sensibly the same. The currents of the Pacific set up the coast of South America towards the Bay of Panama, and another, the continuation of the Japanese current, unnoticed hitherto, but an analogous current-stream to the Gulf-stream of the Atlantic, runs down the coast of Mexico and California also toward the Bay. Thus, Nature seems to indicate, both by winds and currents, that ships crossing the ocean from E. to W. must do so between 30° and the equator, and from W. to E. in a higher latitude than this. In the large diagrams, which illustrated the paper, these currents were clearly shown, and were on Mercator's projection; which, though indispensable in navigation, gives very erroneous notions of the properties of the sphere, which in extended Pacific voyages must be taken into account.

Thus, the apparently direct track on the chart from Panama to Shanghae, China, is W. 8° 37' N.—a line which intersects the Sandwich Islands, and is 8,982 miles in length, the Sandwich Islands lying about midway. But this is very far removed from the shortest line, which from Panama runs entirely inland along the west side of America near Behring's Strait, down the eastern side of Tartary and the Korean peninsula, which line will be 8,089½ miles, or just 900 miles shorter than the rhumb, or apparent direct course. Such being the case, it is manifest that a ship may sail in a course anywhere between these two lines, and will shorten the distance the nearer she keeps to the course in the higher latitude: so that the direct course to or from China will lead up the west coast of America—say as high as San Francisco, and then across the ocean nearly up to the Aleutian Islands, and down the Japanese group, by which she would save in distance about 450 miles. As an extreme case, it may be mentioned that a line of 8,982 miles in length from Panama to China—that is, the same as taken through the Sandwich Islands, may be drawn across the western part of the Atlantic, through Iceland, between Spitzbergen and the North Cape, through Siberia and Chinese Tartary to Shanghae. This may appear paradoxical upon Mercator's chart, but it is correct, and may serve to dissipate many preconceived notions of distance between these widely separated countries.

Of the navigation of the North Atlantic, either by steam or sail, it is needless to speak; the dis-

tances, times, and relays for coaling have been long tried and tested, and therefore it may be presumed that in each case these particulars are minimised. But the steam voyages to Australia, entering upon new ground, have been most decided failures as yet, and in almost every case have been beaten by ordinary sailing-vessels. There must be some general reason for this series of failures, besides the inefficiency of the ships, and I think it may be sought for in the great variety of circumstances that the navigation around the Cabo Tormentoso—the Stormy Cape of the Portuguese, or the Cape of Good Hope of the Dutch—will carry a vessel through. It is seen that the whole system of winds and currents are intersected in this voyage, and therefore that in the main they are both adverse, and the actual distances to be traversed are very great.

We come now to that part of our subject which relates to the absolute distances which will be thrown open to shipping by the canal, compared with those at present followed ; or, what is still more important, the absolute time that it may be expected may be saved by it. With respect to our Eastern possessions in India, China, and Australia, there is a wonderfully great similarity in the distances which must now be sailed over to reach any of them from England. Thus, the mean sailing distances, which we take from Captain Wise's interesting analysis of 100 voyages, is, from England to Bombay, 13,424 miles—time, 115 days, 15 hours ; from England to Madras, 13,629 miles—time, 106 days, 16 hours ; England to Bengal (Calcutta), 14,405 miles—time, 105 days, 7 hours ; and from England to China, 15,238 miles. The distance necessary to be sailed to Adelaide may be about 14,200 miles, and to Sydney, 15,500 miles, around the Cape of Good Hope, or, by steam, 13,880 miles, to be performed in 63 days.

The shorter routes—known as the overland routes from the Mediterranean to the Red Sea, a portion of which has been long established—would make the distance to Sydney, *via* Torres Strait, about 13,288 miles ; but in the outward passage, the wind and current would be almost always adverse, so that this length must be increased, on the score of current alone, perhaps 1,000 miles. The time calculated by Captain Hamond for this route is 75 days. The distance and time to the westward of Australia, which avoids all the terrors to steam navigation in Torres Strait, would be about the same. Now, it will be seen that these distances represent considerably more than half the circumference of the globe ; moreover, they lead through seas where the winds are, at seasons, in most furious opposition to their progress—the currents, also, most violent. It is only of late years, that to beat against the adverse monsoon has been attempted ; and it is stated, that one of the fine steamers employed in the oriental transit was compelled to burn nearly every available part of her construction, when, having run short of fuel, deck, spars, rigging, and cargo, were all cut up. Such an occurrence in the Pacific would be most serious.

Turning our attention to the routes in the opposite direction, or across the Isthmus and Pacific, a very different order of navigation will exist. The Pacific deserves its name ; fine wea-

ther and moderate breezes prevail almost entirely across it—the western portions, perhaps, excepted. In these respects, it differs widely from the Atlantic, where, perhaps, from the accumulation of the trade-winds over the eastern continent, they are impelled with great force on the comparatively narrow breadth of the ocean.

The shortest distance across the Atlantic, from the Lizard to Chagres, and which, perhaps, might be implicitly followed in the homeward route, is 4,666 miles, which, if a steam-vessel can make good ten knots an hour, would be traversed in 20 days, exclusive of the relay if necessary (at the Bermudas). In the first part of her voyage out, the mean direction of the wind and current would be adverse, or favourable on her return ; and the latter portion of this would be reversed, so that these would neutralise each other, and the distance remain the same. The passage of the canal could be made in a few hours.

The shortest distance from the Gulf of San Miguel to the North Cape of New Zealand is 6,715 miles, and leads, as shown, thence to Sydney, about 1,060 miles farther, which, at ten knots, would occupy thirty-two days ; so that the entire distance from the Lizard to Sydney by this route is 12,460 miles, or 1,400 miles shorter than by the Cape of Good Hope, and might be done in fifty-three days' actual steaming ; and as it is presumed that this course would be nearly the best for a sailing vessel, it is shorter by nearly 3,000 miles than the eastern route for this class.

But there is another feature in this route. The winds are favourable for the passage either way ; and outwards, after passing the Galápagos, she will be assisted by a current of twenty miles per day as far as the tropics, by which the distance will be shortened some 300 miles ; beyond this they will probably balance themselves. It is presumed that one stoppage for coal, &c., will be sufficient between the Isthmus and New Zealand or Sydney. By the chart, Tahiti appears to be the best placed, as being midway, and in the line ; but there are some reasons why another port would be preferable. In the first place, the Society Islands are under French domination, and might not be so advantageous to British ships as one more independent. I, therefore, beg to propose that the Gambier Islands, or Manga Reva Group, which possess all the requisite advantages of, with some superiority over, the Tahitian Islands. In the first place, it has a good harbour, and abundance of fresh water. It is lofty, 1,250 feet high, and at present uncolonized. It lies near the great circle route, 3,700 miles from Panama, and 3,960 from Sydney. Of still greater importance, it lies to windward of the Low or Dangerous Archipelago, which, with this exception, are exclusively coral formations. Tahiti, then, would be a most dangerous landfall either for a steamer or sailing vessel. Should a steamer become disabled, or exhaust her fuel, before reaching her port, she might not be able to weather it, when she would drift by wind and current to Tahiti ; whereas, if she made for the latter, and missed, then the next chance would be to make for the Cook's Islands, 500 miles to leeward, or, still worse, for the Tonga Group, 1,400 miles to leeward. It is presumed that a sailing vessel could always reach, with proper management, to

any port of New Zealand, from the Canal, in forty to forty-five, and probably in thirty days ; and if thirty days be occupied from Europe to the West Indies, this will be greatly under the time at present occupied. The return route round Cape Horn, that terror of navigators, would never occur ; all Pacific return navigation would be through the Canal.

Of the American ports nothing need be said ; the advantages of time gained by the transit of the Isthmus are manifest.

We have before said that the shortest route to China and Japan will be along the American coast as high as San Francisco. In the westward passage, towards the southern ports, perhaps the same advantages may be gained by making for the Sandwich Islands ; and if this indirect route be taken, it will be about 9,000 miles, which might occupy a quick steamer forty to forty-five days : she would have fair winds the whole voyage, and be advanced by the favourable current to the extent of about 600 miles. But the return voyage between these ports is a different matter, and, it is contended, would be lengthened by these adverse circumstances to a length equivalent perhaps to 1,800 or 2,000 miles, that is to 10,800 or 11,000 miles, which would quite neutralise any advantages of the Canal. But if the great circle route be taken along Japan, the actual distance will be 8,400 miles, which might be steamed over in thirty-five days, and would be assisted in every probability 700 miles on the voyage by currents. The winds would be favourable during the whole course, and this too might be equivalent to as much ; so that the figures would stand as 6,600 to 11,000 miles for the low and high latitude.

Without dilating on other or shorter voyages, it may be safely asserted, that for all the eastern ports of Australia, China, or the Asiatic Archipelago, although they lie from 60° to 120° of longitude nearer to us by the eastern route, yet they may be reached by tracks shorter by from 1,200 to 3,600 miles, with every advantage of wind and current, which may perhaps be taken at so much more.

It has been shown that in long voyages there are belts of calms ; absolute calms must be crossed, particularly in the Atlantic, which narrow space swallows up on a mean seven days, varying in the 100 voyages cited by Mr. Wise, from three to fifteen days. In the $112\frac{1}{4}$ days mean passage to India, $36\frac{1}{4}$ days are occupied in calms and light airs ; $63\frac{1}{4}$ days in fair winds ; and $12\frac{1}{4}$ days in foul winds. By the use of auxiliary steam, the calculation is, that by slight auxiliary steam-power the Indian voyage may be shortened to 85 days, or by steam up to a better track to even 69 days.

In the Pacific the winds are comparatively light, and perhaps, as a mean, would not command more than seven or eight knots in a sailing vessel. Supposing, therefore, that auxiliary steam is used to make up the speed to ten knots, much even of this is neutralised ; for supposing the ship to be propelled with this velocity, and the wind is abeam with a strength equivalent to eight knots, she will shift the wind two or three points ahead, and cause it to be still more adverse with lighter breezes. It may be, even, that a very light wind aft, may with quick speed

come out dead ahead, so that sails are worse than useless. This renders consideration to the currents of much greater importance.

The progress of steam in the Pacific will depend on the abundance of coal. Fortunately Nature has been as bountiful in this respect here as elsewhere. For the Australian route it must be taken to the intermediate station, and Talcahuana or New Zealand afford ready sources. In the north we have more convenient sites. It has been said by Dr. Coulter, that he found it in the Galápagos, but this must reasonably be doubted. It has been found up the Columbia River. In Admiralty Inlet, and in Vancouver's Island, it is very abundant and excellent. It probably abounds, and certainly exists, in Cook's Inlet. It has been worked in Aliaska. It is found in the Aleutian Islands, and in Behring's Strait. It is worked in Japan, and in the Philippine Islands ; and with a ready and certain market, it might be worked in all these places. Wood has been proposed and tried. It may be had for the cutting in the north and south, but its weak powers, I hear, cannot make it to be depended on for steam-fuel ; a slight addition of coal greatly increases its strength, and it is here suggested, that *bitumen* might be available as an adjunct. There is a bitumen spring near Santa Elena Point, in Ecuador, close to the sea. It has been noticed by Dampier, and still exists as found by Lieutenant Wood, in H. M. S. *Pandora*. Another is found between Point Dume and at Point Vicente, in Upper California, and it becomes an interesting question whether these and others might not be used in *improving* fuel.

A few words as to the commerce it will open up, and bring to our own country. There is not a richer mineral part in the world than the west portion of Ecuador and Peru. The great distance it is from Europe, around Cape Horn, precludes anything but the most valuable of its products reaching us ; but there can be no doubt but that a shorter transit will confer great value upon many natural products which are now most abundant and worthless. One very important item will be thus greatly increased,—the vast deposits of guano on the Peruvian coasts, from which millions of tons may be brought here. The alkaline compounds which cover the plains of Bolivia may be brought into service, and the immense metallic deposits will thus be made one-half, or rather two-thirds, nearer Europe.

All the products of South Western America will bear a proportionately increased value, and create an outlet for industry and speculation. In the north, our American brethren are vigorously pursuing commerce in their new region of California, and one fact will prove what openings there are for increase of commerce. In the month of January, 1853, there were cleared from the Port of San Francisco, 128 vessels, of the aggregate burthen of 47,194 tons. Five years since, a few stray ships found their way here annually, in search of water from the poor and destitute Spanish occupants. A new expedition is now to be fitted out at New York for the exploration and advancement of the capabilities of the N. W. coast. American colonies are being founded all along the coast to the northward, pioneers of future industry and

wealth. Our own territories to the northward are as yet untried and unvisited, but possess all the capabilities of northern Europe. Russian America is a *terra incognita*—its capabilities are unknown.

The Americans boast that the commerce of the Pacific will be their inheritance ;—let us see what it is. A chart with its array of names gives a very exaggerated notion of the lands between the eastern and western worlds. They are, with the exception of the few volcanic groups, mere specks or narrow stripes of land, even with the water's edge, and are immensely populous. The entire insular population of the Pacific has been rated at 20,000,000, but from a careful summary it does not much exceed 1,500,000 to 1,750,000, and this including New Zealand and Australia. The area of the Caroline Islands does not exceed that of the town of Liverpool, yet the population amounts to above 500 per square mile. This is the case with all the coral islands. So that the whole care of the natives must be in procuring food. The only articles as yet gathered is *biche de mer*, or sea slug—an aphrodisiac for China, the pearl-oyster shell, and tortoise shell. The two first might probably be cultivated like our own oyster-fishery, the latter is nearly extinct. Arrow-root and cocoa-nut oil might be had in small quantities, but would not pay as yet. Of the larger islands in the Western Pacific we know little. Their capabilities are quite undeveloped, and are now only being awakened. Thus there can be no commerce at any time in the open ocean, except that to be made in its western part; but its boundaries are open to all the world, and Englishmen will not be backward in availing themselves of it. One branch alone is American, or scarcely can be called American, as it is only a small section of New Englanders, who so vigorously and exclusively pursue the whale fishery, and bring immense wealth annually to their country. But they were almost exclusively whale hunters in the Atlantic, and seem to have distanced all competitors, even of their own nation. That many new sources of profitable enterprise will be opened there cannot be the slightest doubt, and the present greatly increased and increasing importance of our oriental commerce, of our Australian emigration, and the progress of civilization on the western shores of America imperatively demand that this long required inter-oceanic canal should forthwith exist ; and it was considered, that it was especially the province of the Society to discuss the merits of this important question, bearing as it does upon the Arts, Manufactures, and Commerce, of our own country.

The CHAIRMAN, in inviting discussion, remarked, that there were some points on which he was not quite clear. It appeared that Col. Lloyd stated that the level of the Pacific was higher than that of the Atlantic. This was contrary to what he should have anticipated ; and he thought it possible there might be some mistake, as it had been generally supposed that the level of the sea was uniform. It was at one time thought that the level of the Red Sea was higher than that of the Mediterranean ; but on a fuller examination, they were found to

be the same. He agreed with Mr. Findlay in his remarks on Mercator's projection, for whilst it was useful to the mariner, he thought that when used for illustrating geographical subjects to the public, it was calculated to mislead.

The Rev. Mr. NICOLAY said he responded with pleasure to the invitation of the Chairman, although the elaborate paper of Mr. Findlay left but little to be said upon the subject. In all such inquiries it appeared to him that, in this country at least, one great portion of the subject was neglected—being the influence which new routes might exercise on the present exchanges of commerce. He was not aware that any English political or geographical writer had entered at all fully into it. In America the case was different ; so it was in Germany. In the former Guyot had in his lectures directed attention to it ; and merchants, as Asa Whitney, had made it their study : the Government had, moreover, procured every information available on the subject, and the consequence was, that in their political negotiations with foreign powers it was never forgotten. This had led to the possessions of California and Oregon ; to the monopoly of the trade of the Sandwich Islands ; and was the cause of the expedition now about to proceed to Japan. To show how it might affect a canal cut through the Isthmus of Panama, he mentioned Mr. Asa Whitney's theory, that the trade of China and Japan must infallibly be monopolized by the inhabitants of the north-west coast of North America ; in which case, supposing it true, the canal, if cut, would be for the benefit of the two sea-boards of that continent, and not of Europe. In all inquiries for future paths for commerce,—although direct distance should be considered first, and then the nearest practicable route to the direct line,—the ultimate course of commerce must be determined by the exchanges. He had no doubt it would turn out that the world had been so constructed by its great Creator, that hereafter, when all parts of the world should be in communication, these things would be found in perfect harmony ; but at present commercial relations were abnormal, and we must be careful not to attempt to perpetuate such a state of things. He ventured to differ from the Chairman as to the use of Mercator's projection to the mariner. He believed it had led to the abandonment of first principles, and had resulted in a careless and unscientific mode of navigation. The early navigators,—as for instance, Cabot,—directed their courses by spherical calculations ; and Davis, the great northern discoverer, had written a work on Great Circle Sailing, which was now esteemed by some of our shipowners a new discovery. Mr. Findlay's calculations with respect to great circle-sailing were fully borne out by some recently made on an extended scale by himself and his friend Mr. G. Smalley ; but the results arrived at by Mr. Findlay, as far as they regarded sailing-vessels, differed from those of Mr. Whitney and Captain Syng, both of whom had given great attention to the subject, the former having been engaged all his life in the China and Indian trade, in estimating a gain of 3,360 miles to Western Australia by the Cape route, while Captain Syng shows a similar advantage on the voyage to Australia, amounting to 2,285 miles ; he thought that when such authorities differed, it was sufficient evidence that the principles on which their conclusions were based were not sufficiently established. In reference to the route by the Cape of Good Hope to Australia, he expressed his surprise that Kerguelen's Land had not been made a coaling station, or that at least the Steam Companies engaged in the traffic on that route had not

examined into the quality of the coal known to exist there; the harbours being excellent. Among the many subjects to which Mr. Findlay had alluded, one was of great importance; viz., the whale fishery of the Pacific, which had been entirely monopolised by the people of the United States, who had above 400 vessels employed in it (Mr. Findlay said 700). He called attention to the importance of the British possessions on the north-west coast of America, especially Vancouver's Island, on account of its coal; and remarked that the trade of that coast, originally opened by Englishmen, had been lost to us, first by the monopoly of the East India Company, and then of the Hudson's Bay Company, and suggested the establishment of whale fishing stations on that coast, in order to stop the demoralization of the natives of the Pacific, consequent on the long absence from home of the men now engaged in that trade; and concluded by expressing his high sense of the value of Mr. Findlay's paper, and of the extent and accuracy of his geographical researches generally.

CAPTAIN HAMOND, as an old navigator of the Pacific, could not allow the opportunity to pass without expressing his sense of the importance of the information and suggestions contained in Mr. Findlay's paper. In reference to the relative advantages of the route by the Cape of Good Hope and by Panama, he thought the increased and increasing requirements of Australian transit, both as regarded those who had already emigrated there, those going, and those about to go, made it necessary not only that they should be taken there in the shortest time, but also with the greatest ease and comfort to themselves. He proceeded to explain the routes by reference to the map, intimating that the smoothest and most pleasant voyages would be obtained by sailing to Australia *via* the Cape of Good Hope, and returning to England *via* Panama. In regard to new fields of commerce in the Pacific, he thought it was of the utmost importance to give them every attention, as they were increasing in importance every day; and this canal would therefore be of great value. The requirements of our own agriculturists as regarded guano would be benefited by it; and also the trade in copper ore, which now having to be brought round Cape Horn had unparalleled difficulties to contend with. In regard to the currents in the Bay of Panama, he was the first person who brought correspondence from that port to Lima, and he managed it in fifty-two days, thereby effecting a saving of six weeks in the communication of intelligence between England and Lima—a matter of great moment to the merchants at the latter place. He agreed with the preceding speaker as to the importance of Vancouver's Island and our portions of the northern coast of America, and that their resources had not been developed as they would have been by the United States; and referred to California as an illustration, which in 1847 was never called at, except by a solitary whaler in distress. It was now an important state, having cities which had been built and burnt down and rebuilt half a dozen times since their foundation. He had a list of 300 American vessels that had touched at the Sandwich Islands in six weeks.

Mr. DOULL said, in reference to levels, when the Ordnance Surveys of Ireland were made, the level of low-water was taken as the datum; but when they came over to England, they found, from Liverpool to the Bristol Channel, there was a difference of about thirty or forty feet. This was accounted for by the difference in the lift of the tide, and it became evident that low-water could not be regarded as furnishing a proper

datum: the mean of high and low tides was found however to be correct throughout the kingdom. He had no doubt this was the case in the Pacific and Atlantic, and that the difference might be accounted for by the difference in the lift of the tides. In regard to the canal, he thought it was quite clear that they had no data of any service for engineering purposes, and it would be idle to form an estimate with their present meagre information; they could not say whether it would cost 10,000,000*l.* or 15,000,000*l.*, or 4,000,000*l.* or 5,000,000*l.*; and any project in the absence of accurate data must fall to the ground. He believed, however, if the canal were once properly made, it must become, of necessity, one of the noblest highways of commerce. In reading history, every one must have seen that many nations which had been raised by commerce fell by losing it. England was still in the vigour of its youth, yet it was just the time to lay hold of the highways of commerce, of which he might mention two as being of the greatest importance—namely the construction of a line of railway across the North American Continent, colonising as they went along, and opening out the vast fields of mineral wealth known to exist in that territory; and the other, was connecting the Atlantic and Pacific Oceans by a ship canal.

MR. TRELAWNEY SAUNDERS wished to add a remark as to the tides. They were generally now considered as a promulgation of the wave from the south, and were highest on shores exposed to the south wind. At Wicklow there was no tide, whereas opposite, in the Bristol Channel, the tide rose to a height of sixty feet. In regard to this canal benefiting the United States, they knew very well how that country had already dealt with its coasting trade, and how it had affected our Eastern commerce. An American vessel could take a cargo from London to New York, there obtain a second cargo for San Francisco; and by the time she arrived at the latter port she would not only have paid all her expenses, but would have made a profit. She could then go to China, where she would compete with our shipping for a cargo to England; the English vessels having been obliged to take a cargo out there direct, at 3*l.* or 4*l.* per ton, with the expectation of a return cargo at 6*l.* or 7*l.* per ton, but they found that the American vessels were ready and able to do it at 30*s.* per ton. Who, then, could doubt that they would take every advantage of their position to secure the benefits of this canal? He then proceeded to deprecate the traditional course which British commerce was now following, and compared it with the energetic and politic course at present pursued by the American Government, referring to the Japan Expedition as an illustration. The extent and position of the various British dependencies, each offering a nucleus for increasing and improving our commerce, indicated that it was the duty of England to give a new impetus to the commerce of the world, and he trusted it would not fail to do so, but be true to its mission.

THE CHAIRMAN remarked that some time ago the American Government consulted our Government and the Royal Society as to entering into some deep-sea soundings and examinations of the tides. He regretted that it was very coldly received by our Government, and now remained in abeyance. In regard to great circle sailing, he thought much more mystery had been attached to it than was necessary; it was quite clear that the shortest distance between two points on a plane was a straight line, but the shortest distance on a sphere was a great circle. He concluded by proposing a vote of thanks to Mr. Findlay, which was agreed to.

It was announced that at the next meeting, on May 25th, two papers would be read, "On Recent Improvements in Chronometers," by Mr. Loseby, and "On Constructing Glass Balance Springs, and their Application to Time-keepers," by Mr. Wenham.

THE OFFICE OF SECRETARY.

THE claims of the several Candidates for the vacant Secretaryship will be taken into consideration by the Council on June 8th. All applications for the Office must therefore be sent in, on or before Monday the 6th, in writing.

COMMENCEMENT OF THE TRADE MUSEUM.

THE following Correspondence, which has recently passed between the Council of the Society and the Royal Commissioners for the Great Exhibition, will be read with interest by members. The Council hope that the important plan thus commenced, under the joint sanction of the Royal Commissioners and the Society of Arts, will receive from the individual members of the latter that hearty support and aid which, from its great practical utility it well deserves, and which, from their energy and influence, they are so peculiarly able to render it.

Society of Arts, Adelphi, London,

May 7th, 1853.

SIR,—At the Meeting of the Council of the Society of Arts, held on the 13th of April last, the formation of a Trade Museum, as suggested in the Second Report of the Royal Commissioners, was taken into consideration, and it was determined that the Society of Arts should at once undertake to aid in carrying out the plan set forth in the Report.

The Council are of opinion that the Society of Arts can best aid in developing the views of the Royal Commission by commencing the formation of a collection of Animal Produce and Manufactures, as being that element of a General Trade Museum at present virtually altogether unrepresented; at the same time they consider that no opportunity should be neglected which might occur of collecting materials for the other branches of the Museum.

The Council desire in the first instance to ask the approval and co-operation of the Royal Commissioners; and as they feel that notwithstanding the great importance of the object it would not be right for the Society to devote to it so large a portion of their funds as would be requisite, they would propose to set apart the sum of 400*l.*, to be expended in the course of the next two years, provided Her Majesty's Commissioners approve of the proposal, and are willing to devote a similar sum towards the proposed object.

The Council consider that the formation of the collection should be made a special department, altogether independent of the other objects of the Society, and under the control of an officer particularly appointed for the purpose. This important duty they desire to confide to me, and I have already expressed my full willingness to undertake it.

I am therefore instructed by the Council to make this

communication to you, and to request that you will bring it before the Royal Commissioners.

I have the honour to be, Sir,

Your very obedient Servant,

(Signed) EDWARD SOLLY, *Secretary.*

To the Secretary of the Royal Commissioners.

Board of Trade, May 10th, 1853.

SIR,—I am directed by Her Majesty's Commissioners for the Exhibition of 1851, to acknowledge the receipt of your letter of the 7th instant, submitting, on behalf of the Council of the Society of Arts, a proposal for commencing the formation of a Collection of Animal Produce and Manufactures, in furtherance of the establishment of a Trade Museum, as suggested in the Second or "Surplus" Report of the Royal Commission; and requesting to be informed how far the Commissioners will be prepared to co-operate with the Society of Arts in promoting that object.

Her Majesty's Commissioners direct me to acquaint you in reply, that they have received this communication from the Society of Arts with great interest and satisfaction, and that they fully approve of the course which the Society proposes to adopt, as shown in your letter; at the same time that it will afford them much pleasure to give every assistance in their power towards carrying out an object having so direct and important a bearing upon the recommendations contained in their Surplus Report.

With reference to the announcement made by you, that the Society has resolved to set apart the sum of 400*l.*, to be expended in the course of the next two years, towards the formation of such a Collection of Animal Produce and Manufactures, provided Her Majesty's Commissioners are willing to devote a similar sum towards the proposed object,—I am to inform you that the Commissioners are prepared to assent to this proposal, and to contribute the above-mentioned sum of 400*l.* in the manner suggested, to be similarly expended in the course of the next two years.

Her Majesty's Commissioners trust that the exertions of the Society of Arts towards the formation, under your superintendence, of the Collection, will be attended with success; and that advantage may at the same time be taken, as mentioned in your letter, of any opportunities that may present themselves for the simultaneous collection of materials for the other branches of the proposed Trade Museum.

I have the honour to be, Sir,

Your most obedient Servant,

(Signed) EDGAR A. BOWRING.

E. Solly, Esq.,

Society of Arts, Adelphi.

NOTICE TO INSTITUTIONS.

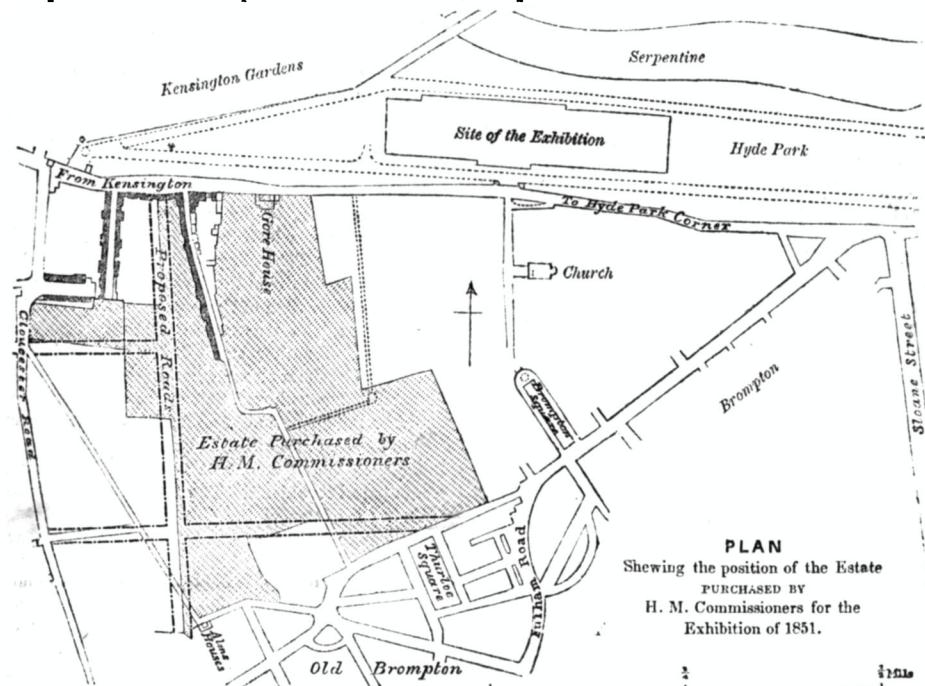
THE Council has much pleasure in announcing that Mr. Babbage has placed at its disposal, for distribution to the Institutions in Union, a limited number of copies of his "Bridgewater Treatise," and also of the Plate of his Analytic Engine, or Calculating Machine. The number being limited, those Institutions desirous of possessing copies of either of these works, are requested to make a special application to the Secretary.

Professor Solly has likewise presented, for a similar object, a number of copies of his pamphlet on Trade Museums, one of which will be sent to each Institution in Union.

PURCHASE OF GROUND AT KENSINGTON; BY THE COMMISSIONERS OF 1851.

The accompanying Map shows the site and extent of the purchases already made, and which, with some trifling exceptions of property to be hereafter purchased, in order to ensure symmetry of shape, constitute the complete area of the site proposed for various National Buildings. The extent is about eighty-six acres, and the cost of the property has been 280,000*l.*, or an average of 3,250*l.* per acre. This timely and judicious purchase has secured space for National Build-

ings in the best part of London, and at a price so moderate that even thus early it might be re-sold at a large profit. The effect of the purchase, it is said, has already increased the value of the property in the neighbourhood upwards of forty per cent. The public will shortly have an opportunity of judging for themselves of the beauty of the site, as the grounds of Gore House will be open to all visitors to the Exhibitions about to take place there next week.



THE SPECIAL PRIZE.

At the Council Meeting on Wednesday last, the 18th inst., the Report of the Judges on the Essays sent in, in competition for the Special Prize offered by the Society, "For the best Essay on the History and Management of Literary, Scientific, and Mechanics' Institutions; and especially how far, and in what manner, they may be developed and combined, so as to promote the well-being and industry of the Country," was read: and the Prize of 50*l.* and the Society's medal was unanimously awarded to the author of the Essay with the motto, "Nemo labori Musas vetet." Mr. James Hole, Honorary Secretary to the Yorkshire Union of Mechanics' Institutes, is the successful competitor.

CONFERENCE.

Society of Arts, Manufactures, and Commerce, Adelphi, London, May 11th, 1853.

SIR,—I am directed by the Council to inform you, that a Conference of the Representatives of the Institutions in Union is to be held at this house on Thursday, June 9th, at 11 o'clock, A.M., precisely.

I am also enabled to inform you that the Lord Mayor, who purposed to hold at the Mansion House a Conversation of the friends of Education on the previous evening

—namely, Wednesday, June 8th—having especial reference to the introduction of a more general and practical cultivation of science and art as branches of general instruction, has been pleased to intimate to the Council that it is his intention to send cards of invitation for that occasion to each of the Representatives of the Institutions in Union, who may be appointed to attend the Conference.

It is also proposed, that on June 9th, after the Conference, the Representatives of the Institutions, the Members of the Society of Arts, and some other Friends of Education, should dine together, at 6 o'clock, P.M., at the Freemasons' Tavern. The arrangements for that dinner will be similar to those of May 18th last year.

I am directed to request you to communicate to me, at your *earliest* convenience, the name and address of the Representative whom your Institution may appoint to attend the Conference: his name will then be made known to the Lord Mayor. I shall be obliged by your also stating whether the Representative will attend the dinner on June 9th. The price of the dinner-ticket will be 7*s.* 6*d.* without wine.

The Council will be glad if your Institution would suggest any subjects which they deem most important to be discussed at the approaching Conference.

I am, Sir, your obedient servant,
EDWARD SOLLY, Secretary.

UNIVERSAL EXHIBITION OF AGRICULTURAL
AND INDUSTRIAL PRODUCTS AT PARIS
IN 1855.

THE Lords of the Committee of Privy Council for Trade have received a communication from the Secretary of State for Foreign Affairs, transmitting a copy of a letter from Count Walewski, the French ambassador at the Court of London, in which it is announced that by a decree of March 8th last, His Majesty the Emperor has ordered that a Universal Exhibition of Agricultural and Industrial Products shall take place in Paris on May 1st, 1855.

The French Ambassador states that exhibitors of those countries who answer to this appeal will meet with every requisite facility, both as regards the Customs regulations, and the reception, arrangement, and security of their products in the Palace of Industry. A later decree, which will be communicated without delay, will determine and specify the conditions of the Universal Exhibition, the rules under which goods will be exhibited, and the different kinds of products which will be admitted. Count Walewski expresses a hope, on behalf of the Government of His Imperial Majesty, that the British Government will do all in their power to direct the attention of British manufacturers to the intended Exhibition of 1855, and that they will answer to the invitation which is now addressed to them, with the same ardour as the French manufacturers responded to the invitation of England in 1851.

In accordance with the request of the Earl of Clarendon, my Lords desire to give the widest publicity to this measure, in order that no effort may be spared in furtherance of the intentions of the Emperor of the French as regards the Exhibition of British Agriculture and Industry.

HENRY COLE, } Joint Secretaries.
LYON PLAYFAIR, }
Marlborough House, May 10th, 1853.

PROPOSED NEW MERCANTILE AND MARI-TIME COLLEGE FOR LONDON.

A public meeting was held on Tuesday last at the London Tavern, to consider the desirableness and best means of establishing a mercantile and maritime college. In the absence of the Lord Mayor from indisposition, the Earl of HARROWBY was called to the chair. The meeting was fully attended. Letters were read from Mr. Hume, M.P., Baron Rothschild, Mr. J. W. Gilbart, &c., regretting their inability to attend the meeting, but expressing sympathy in its object.

Mr. ANDERSON read a report of the proceedings of a Committee which had been formed to carry out the establishment of a Mercantile and Maritime College, of which the following is the substance:—It stated “that much interest had been long felt among the mercantile classes in the reform of our commercial laws, and a spirit of inquiry into the principles which govern commercial law awakened; and a great want had been felt of an institution where the knowledge of these and other branches of education might be within the reach of the classes whose interests were affected. Referring to the growth of our mercantile marine, it was urged, that its success depended on the intelligence and moral character of those in whose charge it was placed, and that competition with other countries rendered it necessary to raise the standard of information, the tone, and habits of seafaring men. In connection with this, the necessity of a trade museum was urged; the formation of which was suggested to the merchants of the City of London by the

Commissioners of the Great Exhibition, and which should contain specimens and samples, and the means of acquiring statistical and commercial information. It stated that no comprehensive library of reference on the subjects of commerce, banking, &c., now existed in the City of London; and that that want ought to be supplied. Those were the causes which prompted a few individuals to form themselves into a committee, to consider in what manner the establishment of a mercantile and maritime college could be accomplished; and with this view they had prepared a statement which had been widely circulated, and the object in question was found to be one universally desirable and worthy of support. Before founding a new institution, attention had been directed to Gresham College, which was now in existence, and it was thought desirable to consider how far the trustees would be induced to enlarge its operations. That was the object of this meeting. Gresham College was once the seat of learning and the liberal arts, and the cradle of the Royal Society, which originally had there a library of 2,000 volumes, besides a repository of instruments, books, &c., but which had long been transferred to another place. The college had at length been levelled to the ground by the authority of an act of the legislature, in consideration of the payment of a ground-rent of 500*l.* a year, the trustees contributing 1,800*l.* to the demolition. Another small building had been since erected in Gresham street, where occasional lectures were delivered. It was hoped that the result of this meeting would be the formation of an institution worthy of the City of London and of Sir Thomas Gresham, and placed under such management as was thought best for the promotion of its objects. The Government had obtained a site in the centre of the City at a small ground-rent, and it was thought that was a claim for its liberal assistance towards the foundation and support of an institution intended to raise the standard of education among the officers of our mercantile marine. It was hoped that the enlightened part of the Common Council and the Merchants' Company would be induced to appoint a committee of inquiry into the whole matter, and see how they could best co-operate for the attainment of the object in view.”

The following Resolutions were unanimously agreed to:

1st.—“That the importance of the City of London as the focus of the mercantile interests of the empire, and the nursery of the largest mercantile marine in the world, demands that it should possess among its other institutions a Mercantile and Maritime College, which may supply sound and extensive information on all branches of practical science, and afford the means of acquiring a knowledge of the principles which govern the various relations of commerce.”

2nd.—“That such a college should also possess a trade museum, to contain samples of produce and manufactures, charts and models, a repository of statistical, general, mercantile, and legal information from all countries, and a commercial, banking, and scientific library.”

3rd.—“That a Committee be formed for carrying out the above objects, to consist of the Earl of Harrowby, Baron Rothschild, M.P., Messrs. Thomson Hankey, F. Russell, M.P., B. Oliveira, M.P., A. Gillespie, J. Dillon, J. W. Gilbart, F. Bennoch, W. Crawford, S. Morley, H. A. Matheson, J. G. Hubbard, W. Hawes, Alderman Wire, &c., &c.”

4th.—“That the Committee be recommended to take into consideration how far Gresham College, or any other similar institution in the City, may, by a proper adaptation to the requirements of the present time, serve as the basis of the Mercantile and Marine College.”

TREATMENT OF FOREIGN WINES.

At a recent weekly evening meeting of the Royal Institution, Mr. Brockedon, F.R.S., gave the following interesting particulars relative to the Treatment of Foreign Wines.

"The wine when pressed is not vatted in large quantities, but placed in casks which have been sulphured, to check fermentation and preserve its sweetness as far as possible. During the winter following the vintage, it is racked two or three times, and in the following spring, about March, the bottling commences.

"In order to obtain the wine with perfect brightness, into each bottle is put a wine-glass full of *liqueur*, which is prepared by dissolving fine candied sugar in wine till it becomes a rich syrup. If the wine is to be made pink, a red wine is used; if pale, white wine. This liquor produces a fresh fermentation in the bottle, by converting the sugar into alcohol and carbonic acid gas. Every bottle on being filled and corked is laid on its side on a frame having holes made through it, into which the neck of the bottle is inserted. As the fermentation advances, every bottle in succession is dexterously shaken gently on its axis every day, to prevent any adhesive deposit on the side of the bottle; and each day it is lifted more and more upright in the frame until the foul portion rests only in the downward neck of the bottle. It is then ready for *dégorgement*, a process by which the foul deposit is removed. The bottle is carefully held in such a position, that when the string which holds the cork is cut, the deposit is blown out by the force of the gas within. The foul matter only is allowed to escape by the skilful use of the fore-finger of the operator, which stops the flow until the effervescence subsides under its pressure. He then quickly and dexterously fills up the bottle from the contents of another already purified. It is then passed with great rapidity under a machine, by which a large cork is forced into the bottle, and is then as rapidly tied. It is afterwards wired and stacked away in vast and cool caves, some of which, thousands of yards in extent, have been excavated in the solid chalk of the hill side. These stacks of bottled Champagne are so ingeniously made, that though they may each contain from 1,000 to 10,000 bottles, any one of them can be withdrawn for examination. In a warm spring, the extent of bursting in these bottles is a cause of great loss. In April, 1843, Madame Cliquot, of Rheims, lost 400,000 out of her stock for that season of 1,600,000 bottles. Further destruction was checked by obtaining from Paris ten or twelve waggon-loads of ice, which, strewn in the caves, lowered their temperature.

"When the wine is thus stacked, the merchants visit the caves to buy, and it is scarcely recommended to their notice, unless the breakage can be shown to be not less than ten per cent. It is this loss, and the cost of labour in preparing, that enhances so much the value of the wine of Champagne.

"The condition of the wine in the bottle can be easily ascertained by a simple means. A fine hollow needle can be thrust through the cork, and a taste obtained from the pressure within, through the tube. On withdrawing the circular needle, the elasticity of the cork closes the puncture."

HOME CORRESPONDENCE.

SELF-SUPPORTING EDUCATION.

SIR.—Since reading my paper on the 27th of April last, my attention has been called to the British and Foreign

Schools in Abbey-street, Spitalfields, as an instance of schools assuming a self-supporting character (so far as regards the annual expenses) in a very poor district. The schools, built for 1000 children, are for boys, girls, and infants; the school-rooms, class-rooms, playgrounds, all good and extensive, are well-fitted for their purposes. There is a Lending Library for the parents, to which they pay, as well as the children; and also a Benefit Society belonging to the Institution.

The payments for schooling are 2d. per week for each child in the infant schools, and lowest class in the other schools; 3d. for the class next above; 4d. for the next, and 6d. per week for the highest class; and these school payments now amount to 500*l.* per annum, or upwards.

The school is in connection with the Committee of Council on Education, and has a number of pupil teachers in both schools; but independent of them, it is the opinion of the master that they might be perfectly self-supporting.

The children purchase their own writing-books; the reading-books (the British and Foreign, and those of the Irish Board) are the property of the school; but it would clearly be a great advantage were the children to purchase them; and in carrying out this the master anticipated little or no difficulty. He has had the boys' schools from the first, and is perfectly aware of the importance of making this class of schools, as far as possible, self-supporting; and some years ago visited Kings Somborne, to see the working of the schools there.

I examined the boys in one class-room (the highest class) about eighty in number; they showed an amount of intelligence it was most pleasing to witness; but what particularly pleased me was the healthy aspect, the cleanliness, and moral tone of the school throughout. Their self-supporting character gives a value to them, as an example, which is very important. The same amount of schooling, if gratuitous, would have been of comparatively little value.

I am, Sir, yours truly,

R. DAWES.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS, May 17, 1853. Joseph Locke, Esq., M.P., Vice-President, in the Chair. The first paper read was "On the Caloric Engine," by Mr. C. Manby, M. Inst. C.E. (Secretary). At meetings of the "Société d'Encouragement pour l'Industrie Nationale," on the 26th January, 1852, and of the "Académie des Sciences," on the 2nd February of the same year, Mons. Galy-Cazalat entered upon an examination of the principles of Ericsson's Caloric Engine, assuming it to be composed of parts analogous to a non-condensing steam-engine. After describing these component parts and their several uses and relative bearings, he gave a quotation from Ericsson's English Patent of December 26th, 1850, stating that it would have led to the idea of a perpetual motion, but that the well-known law governing the elastic force of gases at various temperatures, demonstrated the erroneous principle on which the presumed economy of the caloric engine was based. It was contended, that if the degree of elastic force of a gas was directly proportioned to the amount of caloric combined with it, a certain mechanical power must be exerted, to abstract that caloric from the gas, and no filter could retain any portion, without opposing such a degree of resistance as would destroy the economy.

The next paper read was, "On the Principle of the

Caloric, or Hot Air Engine," by Mr. J. Leslie, M. Inst. C.E. The main objects of the author were to show, that the "Regenerator," or, as he contended it should be called, the "Economizer," was based on the correct principle of the rapid equalisation of temperature of two bodies of unequal temperatures when brought into contact, and that it was practically productive of economy of fuel; that the date of the production of Stirling's Air Engine was antecedent to that of Ericsson; and that the former was decidedly superior to the latter in the general arrangement, in the details of construction, and in the general efficiency. The apparatus called, "Jeffrey's Respirator," was instanced, as an analogous application of the alternate heating and cooling of air, in its passage between metallic surfaces.

The last paper read was, "On the Conversion of Heat into Mechanical Effect," by Mr. C. W. Siemens. In the first section of the paper, the abandonment of the prevailing theory that heat was material (though imponderable) was insisted upon, and it was shown to be untenable by Sir Humphrey Davy's experiment of melting two pieces of ice by friction against each other; by the experiment of Dulong, proving, that although heat was absorbed in the expansion of gases, the specific heat of the gas was not thereby increased; and by the experiment of Joule, of Manchester, who produced heat in several ways by mechanical effort only. The "dynamical theory" was supported by proofs derived from French, German, and English authors of the present day. It was explained, that according to that theory, heat was vibratory motion of the material particles of either solid, liquid, or gaseous substances. In the gases, this motion was so great that it completely destroyed cohesion between the particles, on which account they were better adapted to the production of mechanical effects by heat than either liquids or solids. In the second part of the paper, the practical and theoretical conditions of air engines were examined, and were illustrated by diagrams. The result arrived at in this examination of the general case of an air engine, consisting of an air pump, a heated reservoir, and a working cylinder, into which the heated air was admitted for such a portion of the stroke, as to obtain the maximum expansive action, was, that "theoretically it was not superior, and practically it was much inferior, to an ordinary condensing steam engine." In conclusion, the author referred to his own experiments and practical experience of several years, and enumerated the necessary characteristics of a machine, which, in his opinion, would constitute the most perfect engine, and with different applications of the respirator (or regenerator). The President's Conversazione was announced to be held on Tuesday, May 31st, and members were requested to co-operate in sending models, &c., for exhibition.

PROCEEDINGS OF INSTITUTIONS.

DARLINGTON.—The members of the Mechanics' Institution having long felt the want of suitable premises in which fully to carry out their objects, have taken steps for the erection of a capacious building, and already raised upwards of 1,100*l.* towards defraying the cost, (estimated at upwards of 2,000*l.*); 700*l.* of this sum being munificently subscribed by two ladies,—Miss Pease, of Feethams, contributing 400*l.*, and Mrs. Barclay, 300*l.* On Thursday, the 12th inst., the foundation-stone of this building was laid amidst much rejoicing. The site has been purchased of the Earl of Beverley, and

is situated in Skinner-gate. The building will contain a lecture-hall, 52 feet by 24 feet, capable of holding 600 persons, with gallery, and prepared for side galleries if required; a reading-room, on the ground-floor, 28 feet by 22 feet; library, 18 feet by 16 feet; a committee-room, 24 feet by 13 feet; class-rooms, 18 feet by 12 feet; and accommodation for an attendant to reside on the premises. The architect is Mr. Joseph Sparks, of Darlington. The lecture-hall is for the joint use, under certain regulations, of the Mechanics' Institution, and of the Temperance Society. A few days since the foundation stone was laid with much ceremony, and the members of both bodies mustered strongly on the occasion.

SHERBOURNE.—The course of Lectures at the Literary Institution was brought to a conclusion on Friday last, May 13th, when the President for the year, the Rev. W. H. Turner, ably treated on "The History and the Schools of Painting." Twelve Lectures have been delivered during the session—namely, Mrs. Balfour, on "The Moral and Intellectual Influence of Woman on Society;" Mr. Groves, of Warcham, on "The Geology of Dorset;" the Rev. J. H. Davies, on "The Peninsular War, elucidating the Character of the Duke of Wellington;" Mr. Chatterton, on "The History of the Harp;" Mr. Elihu Burritt, on "Ocean Penny Postage;" Mr. Cowden Clarke, on "Ancient Ballads;" the Hon. and Rev. S. G. Osborne, on "Man Amongst us;" Professor Gardner, on "The Chemistry of the Breakfast Table;" G. Wightwick, Esq., on "Architecture generally considered;" H. D. Seymour, Esq., M.P., on "The British Empire in India;" W. H. Williams, Esq., M.D., on "The Chemistry of the Atmosphere;" and that by the Rev. W. H. Turner, as above. Seven of these were gratuitous. The receipts during the year ending March 25th were 81*l.* 14*s.* 4*d.*, and the expenditure, 60*l.* 10*s.* 8*d.*; leaving a balance in hand of 21*l.* 3*s.* 8*d.*

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

Country Institutions.—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

MISCELLANEA.

ROYAL GEOGRAPHICAL SOCIETY.—The Anniversary Meeting of this Society will take place on Monday, the 23rd inst., for the election of Officers, at one o'clock, P.M. After the reading of the Council Report, the President, Sir Roderick J. Murchison, will present the *Founder's* Gold Medal to Mr. Francis Galton, for his extensive explorations in Southern Africa; and the *Patron's* Gold Medal to Commander E. A. Inglefield, R.N., for his late researches in the Arctic Regions. The President will next deliver the annual address, on the "Progress of Geographical Science and Discovery during the past year." The Anniversary Dinner will be held at Willis's Rooms, at seven o'clock, P.M.

DUTY ON PAPER.—In a pamphlet by Mr. J. B. Crompton, the celebrated paper-maker, of Farnworth Mills, near Bolton, the following remarks occur:—“It is therefore to the repeal of this duty that attention is now particularly directed, on several grounds, each of which is entitled to serious consideration as being for public advantage. The most important feature of this question is, the immense impetus which would be given to the employment of labour. It has already been shown that the partial reduction of duty almost doubled the amount of production; and it is but reasonable to suppose that the repeal of the remaining 1½d. per lb., added to the total removal of all Excise restrictions, would stimulate consumption by reduced cost in a still greater ratio. This of itself would bring into demand a largely increased amount of labour in the manufacture of the article, not only of men, but also of women and children, for whom employment is not generally to be found, particularly in rural districts, where paper-mills are commonly situated; but this is by no means the extent of the benefit which the repeal of this tax would afford, for there is no description of manufacture which, in its subsequent processes of adaptation for the uses of man, affords so much and such varied employment as that of paper. Indeed, it is impossible to give even a faint idea of the thousand ways in which both manual and mental labour is engaged upon the raw material of paper, and any estimate of the additional amount of native industry, which an abolition of this duty would call into exercise, would be deemed almost incredible. Upon a daily newspaper, consuming annually 3,000*l.* value in paper, there is employment given to the extent of 15,000*l.* a year; and when to the increase of labour from this source alone which would arise from the abolition of the duty, there is added the large number of publications which would be called into being solely through the reduced price of the paper, which forms so material an item in the expenditure, the advantage in this respect would be enormous. It has been computed that the repeal of the paper duty would give employment to 40,000 additional people in London alone, besides a vast number in the country; and to these may be added a considerable increase in the various other persons employed in the business of printing and publishing, including folders, stitchers, bookbinders, &c.; and comprising children and adults of both sexes. There are also numerous manufactures, such as millboard, cardboard, papier-mâché, buttons, ornaments, toys, &c., in which paper forms the principal ingredient, and to these a still greater stimulus would be given by the reduced cost of production adding immensely to the employment of every description of labour. If the consumption of paper be traced through its various ramifications, and the number of people be taken into consideration who are employed upon it in other countries, where the manufacture is not subject to duty, it is almost impossible to conceive the vast amount of labour which would be created by its application to uses from which it is now only debarr'd by the duty, so that the relief from this tax would materially augment the national resources, and, in this point of view, produce a greater amount of practical and positive good than any other scheme which could by possibility be devised.” * * * “The raw material from which paper is manufactured is now being purchased by foreigners for exportation, to be manufactured in countries where no tax exists, and the paper produced therefrom superseding, in our own colonies and other countries, British paper. The consequence is, that large quantities of the raw materials are shipped to the United States; and this not only advances the price here, but takes away the labour upon the same, which would otherwise be performed in England.” * * * * * “There is yet another benefit which would arise from the repeal of the paper duty. It has been shown by the most experienced and extensive publishers, that the duty on paper is the sole bar to the issue of publications of an instructive character, at so low a price as to bring them within the reach of the million; and many of them, after having attained a very extensive circulation, were compelled to be discontinued, owing solely to the heavy losses which the paper duty inflicted upon the proprietors. The want of such works is severely felt in densely-populated districts, where the temptations to

profligacy, immorality, and drunkenness, are irresistible to the uneducated, unless their thoughts are diverted from sensual indulgence to the innocent enjoyments which might be afforded by reading, but to obtain which cheapness is indispensable.”

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 12th May, 1853.*
 210(1). Chatham Election—Index to Minutes of Evidence.
 428. Totnes Election—Report from the Committee.
 438. Legacy, &c., Duties—Return.
 443. Chapters—Return.
 444. Ship *Rattlensake*—Copies of Instructions.
 471. Lyme Regis Borough—Correspondence.
 464. Bills—Hackney Carriages (Metropolis), amended.
 465 ,—Taxing Officers, Common Law Business (Ireland), amended.
 466. ,—Expenses of Elections.

Delivered on 13th May.

191. Local Acts—Reports of the Admiralty.
 459. Probate Duty—Return.
 460. Customs—Return.
 469. Dowie's Patent Boots—Correspondence.
 226. Ionian Islands—Return.
 473. Bill—Convicted Prisoners' Removal and Confinement. Criminal Offenders (England and Wales)—Tables.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 13th May, 1853.

Dated 28th April.

1031. J. Berry and T. Booth—Machinery for printing woven fabrics and paper.
 1033. W. H. Sitwell—Projectiles.
 1035. W. A. Gilbee—Apparatus for heating. (A communication.)

Dated 29th April.

1037. G. T. Day—Travelling packages.
 1038. T. Pennell—Revolving fire-arms.
 1039. C. A. Joubert and J. C. Kohler—Bucks for stays.
 1040. R. Davison and J. C. Horrocks—Conveying and separating granular substances.
 1041. T. C. Banfield—Machinery for chopping roots, &c. (A communication.)
 1042. T. C. Banfield—Drying and preserving vegetable or other saccharine plants. (A communication.)
 1043. J. S. Vigoureux—Combing wool, &c.
 1044. J. Macpherson—Looms.
 1045. C. Mather—Bleaching apparatus.
 1046. H. Withaff—Filters. (A communication.)
 1047. O. P. Drake—Apparatus for vapourising and burning benzole, &c.
 1048. J. Kealy—Mowing machinery.
 1049. J. Bristow and H. Attwood—Consuming smoke.

Dated 30th April.

1050. C. Adams—Valve for cisterns and float-valve.
 1051. B. Barrett—Treatment of natural or artificial stone for hardening and colouring same.
 1052. J. Smith—Machine for cutting chaff, &c.
 1053. W. Grimshaw—Slubbing and roving frames.

Dated 2nd May.

1054. J. and W. and T. Balmforth—Steam-hammer.
 1055. J. Smith—Flooring-cramp and lifting-jack.
 1057. H. C. Jennings—Manufacture of soap.
 1058. J. F. Kingston—Reaping and mowing machinery.
 1059. E. Heywood—Regulating throttle-valves of steam-engines.
 1060. J. Reeves—Machinery for crushing ores, &c.
 1061. G. Murton and W. H. Langshawe—Stretching, dressing, &c., cotton, &c.
 1062. A. E. L. Belford—Manufacture of sugar. (A communication.)
 1063. D. Reading—Bearings for axles, &c.
 1064. F. Monfrant—Lubricating materials.
 1065. A. E. L. Belford—Sawing-machines, &c. (A communication.)
 1066. A. M. C. C. Faure—Manufacture of geographic and other maps.
 1067. C. Radunsky—Electro-voltaic apparatus. (A communication.)
 1068. M. Newton—Carriages, and prevention of their overturning. (A communication.)
 1069. J. T. Wood—Boxes hitherto made of pasteboard.
 1070. H. Manc—Steam-engines.

Dated 3rd May.

1071. T. Claridge—Cutting or shearing metals.
 1072. G. T. Holmes—Threshing machines.
 1073. R. W. Swinburne—Manufacture of glass.
 1074. G. F. Goble—Locks.
 1075. R. Quin—Cases for jewellery, &c.
 1076. S. V. Bonnetterie—Machinery for manufacture of screws.
 1077. E. T. Bainbridge—Motive power.
 1078. L. Cornides—Treatment of ores.
 1079. T. and J. Chambers—Kitchen sinks.
 1080. F. Arnold—Binding books.
 1081. W. E. Newton—Hot-air furnaces, &c. (A communication.)
 1082. F. Lipscombe—Propelling.
 1083. W. E. Newton—Machinery for dressing millstones. (A communication.)

Dated 4th May.

1084. G. Bell—Machine for several agricultural purposes.

APPLICATIONS WITH COMPLETE SPECIFICATIONS FILED.

1101. W. Buckwell—Construct of buildings. May 5th, 1853.
 1102. C. Larbaud—New trigger pistols, &c. May 5th, 1853.

WEEKLY LIST OF PATENTS SEALED.

Sealed 12th May, 1853.

727. John Henry Johnson, of 47, Lincoln's Inn-fields and Glasgow—Improvements in measuring and registering the flow of fluids. (A communication.)
 735. Robert Lucas, of 3, Furnival's-inn—Invention of improved machinery to be used in the preparation of cotton and other fibrous materials for spinning. (A communication.)

Sealed 13th May.

748. Constant Jouffroy Duméry, of Paris—Improvements in the manufacture of metallic pipes and tubes, and in the machinery employed therein.
 750. John Mirand, of Paris, and 16, Castle-street, Holborn—Improvements in the construction of electric apparatus for transmitting intelligence.
 773. Henry Russell, of Norwich—Improvements in pianofortes.

Sealed 16th May.

769. Francois Vallée, of Bruxelles—Improvements in preparing, spinning, and doubling flax, cotton, wool, silk, and other fibrous materials.

Sealed 17th May.

817. James Hume, of Birkenhead—Improvements in water-closets.
 841. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue de l'Echiquier, Paris—Improvements in machinery for manufacturing fishing and other nets. (A communication.)
 846. Joseph Henri Combres, of 14, Rue des Prêtres, Paris—Invention for preventing the ill effects of dampness in walls and dwellings. (A communication.)
 848. Charles Finlayson, of Manchester—Improvements in apparatus for heating, drying, and ventilating.
 855. Robert Mortimer Glover, M. D., of Newcastle-on-Tyne—Improvements in coating the bottoms and other parts of ships and vessels, in order to prevent animal and vegetable growth in contact therewith.
 858. John Tatham and David Cheetah, of Rochdale—Improvements in machinery or apparatus for preparing, spinning, and doubling cotton and other fibrous substances.
 869. Adam Ogden, of Huddersfield, and John Ogden, of Hey Chapel, Ashton-under-Lyne—Improvements in machinery for spinning cotton or wool.
 870. James Ward Hoby and John Kinneburgh, of Renfrew—Improvements in the manufacture of metal castings.
 887. Thomas Wood, of the Glue Works, Hunslet, Leeds—Improvements in the mode of obtaining motive power.
 942. Peter Walker, and Andrew Barclay Walker, of King-street, Warrington—Improvements in fermenting ale and porter, and other liquids.
 961. Joseph Cliff, of Wortley, Leeds—Improvements in the mode of making and compressing bricks, lumps, tiles, quarries, terra cotta, and other similar articles.
 988. Samuel Aspinwall Goddard, of Birmingham—Improvements in the construction of pistols.

993. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue de l'Echiquier, Paris—Improvements in machinery for applying metallic capsules. (A communication.)

1072. Peter Armande le Comte de Fontaine Moreau, of 4, South-street, Finsbury, and 39, Rue de l'Echiquier, Paris—Invention of an improved lamp, which I call "lamp omnibus." (A communication.)

1111. William Wilkinson, of Nottingham—Improvements in the manufacture of paper and pasteboard, and in the production of a substance applicable for veneers, panels, and to many purposes to which gutta percha and papier maché are applicable.

1. William Wilkinson, of Nottingham—Improvements in taps and other apparatus for filtering and drawing off liquids.

60. Richard Walker, of Birmingham—Improvements in the manufacture of buttons.

330. William Romaine, of Sackville-street, Piccadilly—Improvements in rendering wood more durable and uninflammable.

404. Joseph Skerthley, of Kingsland, and Ainsty, Leicester—Improvements in copying-presses.

412. William Bridges Adams, of Adam-street, Adelphi—Improvements in railways.

510. William Edward Newton, of 66, Chancery-lane—Improvements in capstans. (A communication.)

568. Godfrey Simon, and Thomas Humphreys, of Pennsylvania, America—Improvements in carriages.

630. Robert Christopher Witty, of 1, Portland-place, Wandsworth-road—Improvements in the manufacture of gas.

643. Thornton John Herapath, of Bristol—Improvements in treating sewage, and in manufacturing manure therefrom.

654. Samuel Colt, of Spring-gardens—Invention of improved apparatus for heating and annealing metals.

659. William Blinkhorn, of Sutton, Lancashire—Improvements in the construction of furnaces and annealing kilns employed in the manufacture of glass.

660. George Johnson, of Stockport—Improvements in looms for weaving.

666. William King Westly, of Leeds—Invention of an improved comb or gill for heckling, drawing, roving, and otherwise preparing to be spun, hemp, flax, tow, silk, wool, and other fibrous materials.

677. George Ross, of Hatton garden—Invention of an improved manufacture of lubricating oil, and a mode or modes of applying such oil to the purposes of lubrication. (A communication.)

685. Samuel Radcliffe, and Knight William Whitehead, of Oldham—Improvements in machinery or apparatus for grinding or setting the surfaces of cylinders and rollers employed in carding engines.

686. Alfred Vincent Newton, of 66, Chancery-lane—Invention of an improved construction of oil lamp. (A communication.)

690. Moses Poole, of Avenue-road, Regent's-park—Improvements in generating steam and other vapours. (A communication.)

691. Jean Marie Durnerin, of 11, Rue de la Monnaie, Paris—Improvements in apparatus for extracting liquid out of solid substances, specially applicable to the treatment of fatty matters.

692. Moses Poole, of Avenue-road, Regent's-park—Improvements in obtaining power where air is employed. (A communication.)

693. Isaac Taylor, of Stanford-rivers, Essex—Improvements in machinery for printing woven and other fabrics.

701. William Johnson, of 47, Lincoln's Inn-fields and Glasgow—Improvements in rolling and shaping malleable metal. (A communication.)

703. Frederick Futyrove, of Regent-street—Improved apparatus to be employed in games of chance.

714. William Prior Sharp, of Manchester—Improvements in machinery for spinning and doubling cotton and other fibrous materials.

736. Augustin Chrysostome Bernard, and Jacques Marie Pierre Alberic, of Paris, and 4, South-street, Finsbury—Invention of an improved mode of giving publicity.

739. Samuel Fox, of Stockbridge Works, Deepcar, near Sheffield—Improvements in the frames of umbrellas and parasols.

762. James Bowron, of the Tyne and Tees Glass-works, South Shields—Improvements in the manufacture of crown sheet, plate, and bottle glass.

764. Robert Dalglish, of Glasgow—Improvements in dyeing.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
May 17	3459	Improved Flap and Drain-mouth for Sewers	Humphreys and Thirst	Halsey-street, Chelsea.
,, 18	3460	Vertical Tubular "Fire-box" Boiler	John Mackay	The Iron-works, Drogheada.